Claims

[c1] What is claimed is:

1. A surface isolation device for isolating a predetermined area of a second surface of a wafer from an etching solution when the etching solution etches a first surface of the wafer to form a plurality of manifolds in the wafer, the surface isolation device comprising:

a base for positioning the wafer;

a first isolation ring positioned on the base for isolating the predetermined area from the etching solution; and

a fixture for fixing the wafer on the base;

wherein when the fixture fixes the wafer on the base, the wafer adheres to the first isolation ring so as to isolate the predetermined area from the etching solution.

[c2] 2. The surface isolation device of claim 1 wherein when the fixture fixes the wafer to the base, the second surface of the wafer faces toward the base and the first isolation ring surrounds the predetermined area.

[c3] 3. The surface isolation device of claim 2 wherein the fixture is a clamp for clamping the wafer on the base.

[c4] 4. The surface isolation device of claim 2 further comprising a second isolation ring, the fixture fixing the second isolation ring on the first surface of the wafer so as to isolate an edge of the wafer from the etching solution.

[c5] 5. The surface isolation device of claim 4 wherein the first isolation ring and the second isolation ring clamp the edge of the wafer to isolate the edge from the etching solution.

[c6] 6. The surface isolation device of claim 4 further comprising a holder for fixing the second isolation ring, the holder comprising an opening, wherein when the fixture fixes the holder above the wafer, the etching solution is capable of flowing through the opening of the holder onto the first surface of the wafer.

[c7] 7. The surface isolation device of claim 2 wherein the base comprises a first side and a second side, the first isolation ring being positioned on the first side

of the base, the surface isolation device further comprising a third isolation ring positioned on the second side of the base for isolating a predetermined area of a second surface of a second wafer from the etching solution, the second surface of the wafer facing toward the first side of the base when the fixture fixes the wafer on the first side of the base, and the second surface of the second wafer facing toward the second side of the base when the fixture fixes the two second wafer on the second side of the base.

[c8] 8. The surface isolation device of claim 7 further comprising a second isolation ring and a fourth isolation ring, the fixture fixing the second isolation ring and the fourth isolation ring on the second surface of the wafer and the second surface of the second wafer to isolate an edges of the wafer and an edge of the second wafer the etching solution, respectively.

[c9] 9. The surface isolation device of claim 8 wherein the first isolation ring and the second isolation ring clamp the edge of the wafer fixed on the first side of the base to isolate the edge of the wafer from the etching solution, and the third isolation ring and the fourth isolation ring clamp the edge of the second wafer fixed on the second side of the base to isolate the edge of the second wafer from the etching solution.

[c10] 10. The surface isolation device of claim 8 further comprising a first holder and a second holder, the second isolation ring being fixed on the first holder, the fourth isolation ring being fixed on the second holder, each of the two holders having an opening, wherein when the fixture fixes the two holders on the two wafers, the etching solution is capable of flowing through the openings of the two holders onto the first surfaces of the two wafers.

[c11] 11. The surface isolation device of claim 1 wherein the fixture further comprises an attachment ring and an upper cover, the base comprising a tank for placing the wafer, the first isolation ring, and the attachment ring, the attachment ring being placed between the wafer and the upper cover, the upper cover being used for pushing the attachment ring toward the wafer so that the wafer adheresto the first isolation ring, the upper cover having an opening to allow the etching solution to flow onto the first surface of the wafer.

[c12] 12. The surface isolation device of claim 11 wherein the upper cover further comprises a first screw thread formed on an inner surface of the upper cover for rotatably engaging with a second screw thread on the base so that the upper cover is capable of pushing the attachment ring toward the wafer.

[c13] 13. The surface isolation device of claim 11 further comprising a second isolation ring fixed to the attachment ring, and when the upper cover pushes the attachment ring toward the wafer, the second isolation ring adheres tothe first surface of the wafer to isolate an edge of the wafer from the etching solution.

[c14] 14. The surface isolation device of claim 1 wherein the base is a hollowcylinder, the fixture being placed on the second surface of the wafer for pushing the wafer toward the hollow cylinder so that the wafer is fixed on the hollowcylinder, the hollow cylinder comprising a lip surrounding a bottom end of the hollow cylinder, the first isolation ring being placed on the lip and adhering to the first surface of the wafer.

[c15] 15. The surface isolation device of claim 1 wherein when the fixture fixes the wafer on the base, an external force is applied to the first isolation ring and leads to distortion of the first isolation ring, causing the wafer to adhere tothe first isolation ring.

[c16] 16. The surface isolation device of claim 1 wherein the wafer is a silicon wafer.

[c17] 17. The surface isolation device of claim 1 wherein when the etching solution etches the first surface of the wafer, a plurality of chambers are formed in the wafer, each of the chambers connected to a corresponding manifold.